2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

Intoil, Inc. (hereinafter referred to as the "Operator") has proposed to drill and develop up to a maximum of 73 additional natural gas wells in the Cooper Reservoir Unit (CRU) and adjacent areas, over a five (5) to ten (10) year period. This proposal would allow for the continued development of natural gas reserves within the CRU and would also provide Intoil with the opportunity to expand the current boundaries of the Cooper Reservoir Natural Gas Field through additional exploration on leases directly adjacent to the CRU. The precise number of wells ultimately drilled, exact locations of the proposed drill sites, and timing of drilling activities would be dictated by:

- the continued success of exploratory or "step-out" wells drilled in the fringe areas surrounding (abutting) the existing CRU, and

- future economic considerations including natural gas prices at the well head compared with the cost(s) to develop, what may prove to be, marginal properties on the fringes of the heretofore known geologic structure (KGS) within the CRU.

Should attempts by Intoil and other mineral interest owners to develop the fringe areas surrounding the CRU not be totally successful, then the level of drilling and production activity in these fringe areas, as described below, would be at a reduced level. Based upon this information, this environmental assessment (EA) addresses both the Proposed Action and the No Action alternatives.

- Proposed Action. This alternative would allow the Operator and/or other mineral interest owners to drill/develop up to 73 additional wells and install related production (ancillary) facilities within the Cooper Reservoir Natural Gas Development Project Area (CRNGDPA).

- No Action Alternative. This alternative implies that both ongoing and previously approved natural gas exploration, development, and production activities would be allowed to continue by the Bureau of Land Management (BLM) in the overall project area, but additional development of leases in the CRU and adjacent areas as currently proposed would be disallowed. Future Applications for Permit to Drill (APD's) and Right-of-Way (ROW) applications would be evaluated by the BLM on a case-by-case basis through site specific environmental analyses in accordance with management direction contained in the RMP for the Platte River Resource Area.

Infill wells drilled on established spacing patterns (e.g., either 40 or 80 acres) within the existing CRU would be classified as development wells, while those "step-out" wells drilled on a 160 acre spacing pattern on the fringes of the CRU and on leases outside of but adjacent to the CRU would be classified as exploration wells.

2.2 PROPOSED ACTION

The proposed action entails additional exploration for and development of natural gas resources within:

) the Cooper Reservoir Unit;

2) adjacent leases to the north and west of the CRU boundary in which Intoil either has, or is attempting to acquire, an interest therein; and

3) within a one-half (1/2) mile buffer zone around the southern and eastern sides of the CRU (see Figures 1.2 and 1.3) encompassing acreage in which the Operator currently has no interest.

These proposed exploration and development activities would commence in the spring of 1998 and would continue over a period of approximately 10 years, with the productive life of wells drilled in the CRNDGPA estimated to be in excess 20 years. Well spacing patterns would vary across the project area and would typically range from a maximum of 160 acres/well (4 wells per section) for exploratory (wildcat) wells drilled in untested (fringe) areas both within and adjacent to the CRU, to a maximum of 40 acres/well (16 wells per section) for development wells drilled in those areas which prove to be commercially productive either as a result of previous or future drilling efforts. Various associated facilities (e.g., roads, pipelines, water wells, compressor stations, etc.) would also be constructed in conjunction with development of the natural gas resource in the project area.

The proposed exploration/development program would be designed primarily to test the productive potential of the Lower Fort Union/Lance (LFU/L) undifferentiated and Lance Formation(s) to a maximum depth of approximately 11,500 feet. Deeper formations such as the Mesaverde, Frontier, and Dakota may be evaluated at selected locations within the CRNGDPA at some future date; however, the Operator currently has no firm plans for the evaluation of these deeper formations.

Upon completion of drilling operations, these formations would be evaluated and a decision made as to the productive potential of both the LFU/L undifferentiated and/or Lance Formations. In most cases, initial well completion operations would first focus an attempt to establish commercial production from the deeper geologic horizons of the LFU/L undifferentiated Formations. In those cases where these deeper formations were deemed to be non-productive, the Operator would then proceed with completion operations on the shallower geologic horizon(s) of the LFU/L undifferentiated Formations (as warranted) in an attempt to establish production therefrom. However, in those cases where commercial production was initially established from the deeper geologic horizons of the LFU/L undifferentiated Formations and the initial evaluation of the shallower geologic horizons proved promising, a second (or twin) well would be drilled on the existing well pad and completed in an attempt to establish commercial production from the shallower geologic horizons of the LFU/L undifferentiated Formations.

The proposed action would result in approximately 200.75 acres (2.75 acres/well) of new surface disturbance resulting from the construction of additional well locations (including on-site gathering, measurement, and dehydration facilities); 30.42 miles (147.48 acres) of new road construction,

reconstruction of approximately 3.97 miles of existing oilfield road to a higher standard (1.92 acres), 30.42 miles (147.48 acres) resulting from the construction of new pipeline rights-of-way; and approximately 10 acres of new surface disturbance resulting from the installation of ancillary facilities (e.g., enlargement of the existing compressor station, centralized tank battery, power lines, water wells, etc.). Total new short-term and life of project (LOP) surface disturbance resulting from the Proposed Action would be 507.61 acres and 287.25 acres, respectively (see Sections 2.2.3 and 2.2.4).

2.2.1 Project Schedule

Completion operations are currently underway in the CRU on well locations which were previously approved by the Platte River Resource Area Office, Bureau of Land Management (USDI-BLM 1996) and subsequently drilled during the 1996 and 1997 drilling seasons. Upon completion of the 1997 drilling season, the Operator had drilled a total of 9 additional wells within the CRU, all of which have been initially completed as producing natural gas wells. An additional 4 NOS's have been submitted to BLM by the Operator for continued drilling operations in the CRU and final approval of these drilling proposals is contingent upon the completion of this analysis document. Drilling operations on these 4 wells will probably commence sometime in the spring/summer of 1998 - these 4 wells are included in the 73 total wells referenced in Section 1.1. Table 2.1 provides a listing of those actions currently pending in the CRNGDPA.

Table 2.1

Currently Proposed Exploration and Development Activity within the CRNGDPA

Operator of Well	Well Name and Number	Legal Location of Proposed Well				Type of Action	Date Filed
		Quarter	Section	Township	Range		
Intoil, Inc.	CRU #15	NW¼SW¼	3	35 North	87 West	NOS	08/26/97
Intoil, Inc.	CRU #16	SW¼NW¼	3	35 North	87 West	NOS	08/26/97
Intoil, Inc.	CRU #17	NW¼SW¼	10	35 North	87 West	NOS	08/26/97
Intoil, Inc.	CRU #18	NW¼SE¼	10	35 North	87 West	NOS	08/26/97
Intoil, Inc.	CRU #19	SE¼SW¼	10	35 North	87 West	Letter	04/13/98
Prima Oil & Gas Co.	Federal #11-23	SW¼NW¼	11	35 North	87 West	NOS	06/18/96

Drilling operations on additional wells within the CRU would commence in the spring/summer of 1998 and would continue over a period of approximately 5 to 10 years or until such time as:

- the total number of proposed wells have been drilled,
- the economic limits of the field have been fully defined, or

- current economic conditions deteriorate to the point that it is no longer economic to drill and complete wells in the project area.

Generally speaking, drilling operations would be expected to occur on a seasonal basis (e.g., late spring, summer, and early fall) utilizing a maximum of two (2) drilling rigs to completely develop the field.

2.2.2 Transportation and Workforce Requirements

Construction and rig crews, materials and equipment would be transported to the project area over U.S. Highway 20/26 and Natrona County Road #212 (Gas Hills Road) (see Figures 1.1 and 1.3). Construction, rig crews, and support personnel typically would be housed in the Casper area, eliminating the need for a man camp or temporary housing within the project area. Other support personnel (e.g., cementing, frac, and/or perforating crews) would also be based out of either Casper or Riverton and housed therein.

2.2.2.1 Transportation Requirements

The Operator would be required to comply with existing Federal, State and County requirements and restrictions developed to protect road networks and the traveling public. Special arrangements would be made with the Wyoming Transportation Department and Natrona County Road and Bridge Department, as required, to transport oversize, overlength, and/or overweight loads to the project area. Otherwise, load limits would be observed at all times to prevent damage to existing road surfaces.

2.2.2.2 Workforce Requirements

Construction Operations. Construction of each individual well location and new access road (if required to tie the proposed well site to the existing road network), would require an average of 4 individual workers for a period of approximately 5 days per well location. These workers would include both heavy equipment operators engaged in construction of the access road and well pad, as well as truck drivers engaged in hauling heavy equipment to and from each respective well location.

Drilling Operations. Typically, rotary drilling rigs employ 4 workers per 12 hour shift, with 2 crews on shift and 2 crews on days off (depending upon the particular drilling contractor selected). In addition, drilling rigs typically employ a drilling foreman who is generally on-site (or on call) 24 hours a day while the rig is drilling. Depending on where the drilling rig is based, these crews would either return to their homes or to local lodging when not on shift. Similarly, these crews would normally return home when on days off. There would be no provision for either permanent or temporary quarters for rig crews within the project area during drilling operations.

Supervisory and Technical Personnel. Generally, drilling wells require constant attention to the technical aspects of the drilling operation (i.e., geology and engineering). Consequently it is anticipated that a minimum of 4 additional personnel would be on location at various stages during the drilling operation. These personnel would generally include a drilling supervisor/engineer, a geologist, and two mud loggers. In many cases, these individuals are also required to remain on location 24 hours a day once drilling operations commence and trailers would be provided on-location for their use. In addition to company and contractor personnel engaged in supervision of the overall drilling operation, BLM or WOGCC personnel (as applicable) would periodically visit the well location in order to ensure compliance with the approved APD.

Completion Personnel. Completion units typically employ approximately 4 workers per crew, plus a company supervisor. Routine completion operations would only be conducted during daylight hours; consequently, workers would generally seek lodging in the nearest community when not on the job. The Operator has typically utilized well servicing companies which are located in the Casper or Riverton areas; consequently, these workers would return to their individual homes at the end of each work day.

2.2.3 Well Pad Construction

A typical location layout for individual well locations is shown on Figure 2. Major components of each individual well pad include:

- a leveled area suitable for placement/support of the drilling rig and related equipment;
- an earthen reserve pit designed to contain drilling fluids, drilled cuttings, and fluids produced during the drilling operation; and
- an earthen flare pit to be utilized for the safe ignition of flammable gases produced during drilling, completion, and testing operations.

The entire well pad area would be cleared of all vegetation and graded to the required specifications prior to moving in the drilling rig and subsequent commencement of actual drilling operations (see Figure 2.1). Prior to grading, the top 6 inches (at a minimum) of topsoil (approximately 1,500 yd^3) would be removed from all areas of cut, fill and/or subsoil storage and stockpiled for future use in reclamation. After the topsoil has been removed, the well pad would be graded to produce a level working platform around the drill hole for support of the rig substructure. The excavated soil material (subsoil) would be utilized in overall pad construction, with the finished well pad graded to allow for positive drainage of natural water (e.g., rain and/or snow melt) away from the drill site. Generally, each individual well location would be designed so that the amount of soil material excavated (less the stockpiled topsoil) should "balance", thereby eliminating the need to store excess subsoil material(s) in large stockpiles adjacent to the well location until site reclamation. Balancing of the excavated soil material would apply to the leveled area of the pad and would not include any materials excavated from the reserve pit below the finished pad grade. Subsoil excavated from the reserve pit would be stockpiled directly adjacent to the reserve pit (see Figure 2.1) and would be utilized to backfill the pit once operations were completed and the pit was reclaimed.

The leveled area required for initial drilling and completion operations for each individual well (well pad) would be approximately 1.73 acres in size (including the reserve pit). In addition, an average of approximately 1.02 acres would generally be required for cut/fill slopes and topsoil/subsoil stockpiles, resulting in approximately 2.75 acres of total surface disturbance per individual well location. Drilling of "twin" wells to shallower geologic horizons of the LFU/L undifferentiated Formations typically would not result in any additional surface disturbance as the "twin" well would utilize the pre-existing well location for operations (refer to Section 2.2.5).

Erosion control would be maintained through prompt revegetation and by constructing surface water drainage controls such as berms, diversion ditches, and sediment ponds as necessary at each well location. Stormwater Pollution Prevention Plans (SWPPP's) would be prepared for all well locations, access roads, and other development sites as required by the State of Wyoming.

2.2.4 Access Roads

Initial exploration and development activities within the CRU have resulted in the construction of approximately 4.19 miles (22,104 feet) of new (resource) access road. Of this total, approximately 3.97 miles (20,962 feet) would be considered as collector roads for additional exploration and development within the CRNGDPA and would require widening to allow for increased traffic volumes thereon. These roads are currently estimated to be approximately 16 feet in average width and would require widening by 4 feet to achieve a 20 foot running surface (24 foot subgrade). Reconstruction of these existing roads to this higher standard would result in an additional 1.92 acres of new surface disturbance. New road construction associated with additional exploration and development in the project area would generally average approximately 2,200 feet (0.42 miles) of resource road per well location. Considering a total disturbed right-of-way (ROW) width which did not exceed forty (40) feet, this new road construction would result in additional surface disturbance equal to approximately 147.48 acres (or approximately 2.02 acres per well location). As indicated above, no new or expanded access road construction/reconstruction would be required in association with the drilling of "twin" wells to the shallower geologic horizons of the LFU/L undifferentiated Formations. These access roads would be constructed/reconstructed in accordance with roading guidelines established for oil & gas exploration and development activities as referenced in the joint BLM/USFS publication: *Surface Operating Standards for Oil and Gas Exploration and Development*, Third Edition and/or BLM Manual Section 9113 concerning road construction standards on federal lands. Figure 2.2 provides typical guidelines for road construction on projects subject to federal jurisdiction.

2.2.5 Drilling Operations

To facilitate the drilling of these proposed wells, Operators would utilize a minimum of 1 and a maximum of 2 rotary drilling rigs rated for drilling operations to depths of approximately 8,000 feet. Rig transport and on-site assembly would be completed in approximately 4 days, involve approximately 15 people per well location, and require approximately 60 round trips per well location.

Drilling operations would require approximately 14 days per well location from the time the drilling rig is moved onto the location (move in-rig up) until such time as drilling operations have been completed and the rig is moved off of the location (rig down-move out). Figure 2.3 is a schematic representation of a typical drilling rig layout. Drilling operations on the shallower "twin" wells would utilize a smaller rotary drilling rig than that required for operations on wells drilled to the deeper geologic horizons of the LFU/L undifferentiated Formations. Use of a smaller drilling rig for operations on these "twin" wells would allow the Operator to utilize the existing well pad as originally constructed for secondary drilling operations thereon.

After completion of the drilling phase of operations and prior to rig release, the well would be logged and, if warranted, production casing would be set to total depth and cemented into place. Setting and cementing the production casing string would serve to maintain hole integrity while isolating those formations downhole which could potentially contain either fresh water or hydrocarbons. Proper cementing of the production casing string would eliminate the possibility for fluid communication between hydrocarbon bearing zones and/or near surface fresh water aquifers.

Human waste generated at well locations would be collected in standard portable chemical toilets or service trailers and regularly transported off-site to a state-approved disposal site (e.g., Casper or Riverton wastewater treatment plants). Each well location would be provided with one or more such facilities during drilling and completion operations. A septic system would not be required. Non-human waste would be collected in enclosed containers and disposed of at a state-approved waste disposal facility (e.g., Casper Balefill Facility).

2.2.5.1 Drilling Fluids System

The actual drilling operation would utilize a water-based mud system with additives for lost circulation, hole stabilization, and/or conditioning prior to logging and/or running casing. Basically, this system involves drilling with water and utilizing additives to minimize downhole problems. On the average, the Operator would utilize approximately 1.5 barrels of water (42 gallons/barrel) per foot of hole drilled. This water would be obtained from three (3) primary sources:

- Cooper Reservoir Unit #1 Water Supply Well (WSW) located in the SE¼NW¼ of Section 3, Township 35 North, Range 87 West; Permit #UW-107836. This well produces water at a rate of approximately 25 gallons per minute (gpm), which should be sufficient for a single drilling rig operating in the CRNGDPA.

- Knigge #1 water well owned by Mel's Water Service and located in the NE¼NE¼ of Section 30, Township 36 North, Range 86 West; Permit #UW-107461. This well produces approximately 60 gpm and has an earthen storage pit constructed adjacent thereto.

- UP #1 water well owned by Andy & Glena VanPatten and located in the NE¼SW¼ of Section 30, Township 36 North, Range 86 West; Permit #UW-104817. This well produces approximately 25 gpm and also has an earthen storage pit constructed adjacent thereto.

Water to be utilized in drilling operations would be contained in a "reserve pit" constructed on each location (refer to Figure 2.1) and would serve as the base medium for the drilling mud system. The reserve pit would be fenced on the three non-working sides during drilling, with the fourth side of the pit fenced immediately following removal of the drilling rig in order to protect wildlife and livestock. Fencing would be installed in accordance with guidelines contained in the joint BLM/USFS publication: *Surface Operating Standards for Oil and Gas Exploration and Development*, Third Edition and would be maintained until the reserve pit has been backfilled. Netting (1 inch mesh) would be placed over reserve pits containing hydrocarbons or other substances toxic to wildlife in compliance with BLM Information Bulletin Number WY-93-054.

The Operator intends to evaluate the potential for use of a "semi-closed" mud system for drilling operations on "twin" wells within the CRNGDPA. Should this drilling method prove successful, fluids would be contained in steel tanks on location and the cuttings would be deposited in the reserve pit constructed in association within initial location construction. In the event that the reserve pit has already been closed (reclaimed), the cuttings would be transported to an existing reserve pit on another location within the CRNGDPA for disposal. Upon completion of drilling operations, the drilling fluids would be removed from the well location and disposed of in strict accordance with applicable state and/or federal rules and regulations pertaining thereto.

2.2.5.2 Casing & Cementing Operations

Surface casing would typically be set to a minimum depth of 700 feet and cemented back to the surface on each proposed well. This would serve to isolate all near surface fresh water aquifers which could occur in the project area. Upon reaching total depth, production casing would be run and cement circulated to a minimum of 300 feet above the top of the shallower geologic horizons of the LFU/L undifferentiated Formations, effectively isolating all geologic formations encountered down hole in compliance with OOGO Number 2. This procedure would eliminate any possibility for fluid communication between potential hydrocarbon bearing zones and any fresh water aquifers which may be encountered downhole.

2.2.6 Completion and Evaluation Operations

Once the well has been drilled and cased, a completion (work-over) unit is moved onto the well location and completion operations are commenced. These completion operations generally require an average of 3 to 5 days per well location, consist of cleaning out the well bore with water containing a 3% solution of potassium chloride (KCl), pressure testing, and perforating the potentially productive formations downhole.

After the casing has been perforated, production tubing is run and the targeted downhole zones of the LFU/L undifferentiated Formations are fractured. A normal "frac" of each potentially productive formation would include a mixture of approximately 1,500 barrels of fresh water (mixed with KCl to obtain an overall 3% solution) and 100,000 to 150,000 pounds of sand which is pumped down the casing under

extreme pressure and forced through the perforations into the formation. As the formation is fractured, the resultant fissures (fractures) are filled with sand which props them open and facilitates the flow of gas into the well bore and subsequently to the surface.

Upon completion of the frac job, the well is flowed back to the surface in an attempt to recover as much of the frac fluid as possible and to clean excess sand out of the perforations prior to setting production equipment on location and placing the well on line. All fluids utilized in the completion procedure are captured either in the reserve pit or in test tanks on the well location and ultimately disposed of in strict accordance with Wyoming Department of Environmental Quality (WDEQ) rules and regulations. Gases produced in association with completion and testing are diverted to the flare pit. Approximately 30 days of well testing are typically required to recover frac fluids, clean out the perforations, and obtain an accurate flow test of the well.

2.2.7 Production Operations

As wells are completed, production equipment would be set on the location, natural gas pipelines installed and the well placed "on line" with production continuing so long as the well is capable of commercial production and a demand for the gas exists (peak usage periods traditionally occur in the winter months). The on-site production equipment would typically include the following equipment:

- a christmas tree at the well head (a series of valves designed to control pressures and regulate flows from the well);
- a hydrocarbon production unit (3-phase separator) designed to separate liquids from the natural gas stream;
- a glycol regenerating unit, dehydrating contact tower (dehy) with integral scrubber designed to remove any remaining water from the gas stream prior to sales;
- a 50 psi free water knockout designed to remove water from the condensate stream, as needed;
- two 400 barrel storage tanks, one each for produced water and condensate storage; and
- a meter run for measurement of gas volumes produced into the pipeline.

Figure 2.4 is a typical production facility layout designed for those well locations consisting of a single producing gas well.

In those instances where "twin" producing wells are located on a single well pad and both wells have similar producing characteristics, both producing wells would share production equipment to the greatest extent possible. This shared equipment would generally consist of the storage tanks and glycol dehydrator.

Buried flowlines would route the produced gas stream from the individual well head assemblies to individual 3-phase separators in order to separate fluids (condensate and water) from the gas stream prior to sales. These separated fluids would be routed to the appropriate storage tanks on location and the gas stream would then be routed to the glycol dehydrator for final dehydration and then through a sales meter for gas measurement. The gas stream from the "twin" well would be routed through a separate sales meter prior to entry into the glycol dehydrator so that both gas streams may be accurately measured prior to introduction into the sales line. All above ground production facilities installed at each producing well location would be painted a standard environmental color that blends with the surrounding landscape. Refer to Figure 2.5 for a typical production facility layout design for "twin" well locations. As the CRNGDPA develops, the Operator may elect to install centralized production facilities to serve multiple wells within the field. These facilities would be strategically located within the CRNGDPA to provide gas processing and fluids storage for a number of individual wells, thereby reducing the overall cost associated with installation of production facilities on each individual well location. The centralized production facility could also provide an area for surplus equipment storage as well as a field office for personnel employed within the CRNGDPA. The use of centralized production facilities would also increase the area that could be reclaimed on each producing well location. Surface disturbances associated with the installation of centralized production facilities is estimated at a maximum of 10.0 acres overall.

Natural gas production is expected to range from 204,000 to 1,362,000 cubic feet of gas per day from individual wells within the project area. Average field-wide production for the month of October, 1997 was approximately 844,000 cubic feet of gas per day (844 mcfgpd) per well. Table 2.2 shows the typical content of gas produced from the LFU/L undifferentiated Formations in the Cooper Reservoir Natural Gas Field. No hydrogen sulfide (H_2S) is known from these formations, and none is expected to be encountered during project operations (refer to Table 2.2). Some H_2S has been encountered at other well locations in the region. However, this H_2S has been formed biologically, due to contamination of the well bore, and is not naturally present in the natural gas formation(s). Monitoring and due caution would be taken during drilling to ensure that no H_2S is present in the gas stream, and that no biological contamination of the Cooper Reservoir well field occurs.

Condensate production is expected to range from 0 to 20 barrels of condensate per day (bcpd) per well, with an average field-wide production of approximately 7 bcpd per well reported for the month of October, 1997. Condensates consist primarily of long chain hydrocarbon liquids (e.g., pentanes, hexanes, heptanes, octanes) and would be stored in tanks at each individual well location as indicated above (Figures 2.4 and 2.5). In compliance with 43 CFR 3162 and 40 CFR 112.7, all tank batteries would be fenced and bermed with impervious materials to contain the volume of the largest tank plus sufficient freeboard (1 ft) to handle precipitation. Condensates would be periodically removed from storage tanks and transported by truck for sale to refiners for blending purposes. It is anticipated that condensates would be transported from most locations within the project area on an average of once per week.

Water produced in association with the gas stream is expected to range from 0 to 209 barrels of water per day (bwpd) per well, with an average field-wide production of approximately 59 bwpd per well reported for the month of October, 1997. Water is removed from the gas stream through dehydration and the "produced" water is contained in a 400 barrel above-ground produced water tank (see Figures 2.4 and 2.5). Accumulations of produced water would be periodically removed from the storage tank and disposed of in accordance with BLM/WOGCC/WDEQ rules and regulations.

Table 2.2

Fractional Analysis of Combined Natural Gas from Producing Wells in the Cooper Reservoir Unit on February 11, 1997

Gas Component		Mole
Common Name	Chemical Formula	%
Nitrogen	N_2	0.511
Methane	C_1	90.440
Carbon Dioxide	CO_2	0.278
Ethane	C_2	5.537
Hydrogen Sulfide	H_2S	0.000
Propane	C_3	1.907
iso-Butane	i-C_4	0.498
n-Butane	n-C_4	0.430
iso-Pentane	i-C_5	0.187
n-Pentane	n-C_5	0.123
Hexanes	C_6	0.088

At the present time, water produced from wells within the CRU is being disposed of either by discharge to the surface or by subsurface injection at the CRU #1 well, which has been converted to a water disposal well. National Pollutant Discharge Elimination System (NPDES) permits were issued by the WDEQ in 1996 for the surface discharge of water produced from the both the CRU #7 (NPDES Permit #WY0036200) and the CRU #8 (NPDES Permit #WY0036218) natural gas wells. Likewise, the WOGCC issued an Underground Injection Control (UIC) permit in 1996 approving the injection of produced water into the shallower geologic horizons of the LFU/L undifferentiated Formations at the CRU #1 (Docket #136-96). Future disposal of produced water in the CRNGDPA, either by surface discharge or subsurface injection under these existing permits, would be subject to continued compliance with the terms and conditions of said permits.

Routine "on-site" maintenance operations on each producing well location would generally include a daily visit by Operator's field employees who monitor the overall operation of the well and make adjustments as required to ensure the most efficient operation of the well. The productive life of wells in the CRU is expected to be in excess of 20 years once they have been drilled, completed, and placed "on line". Reclamation of areas unnecessary for production operations (approximately 1.50 acres) would be completed within a maximum of 2 years following termination of drilling and completion operations, thereby reducing disturbance at each location to approximately 1.25 acres for the LOP.

2.2.8 Pipeline Gathering System

Natural gas produced from wells within the CRNGDPA would be transported from each producing well location via buried pipeline to a connection with a pre-existing natural gas pipeline (gas gathering system)

(network) for compression, dehydration, and subsequent delivery to market. These individual well pipelines would generally be routed to the nearest existing gathering line and would be installed below ground and adjacent to existing access roads to the greatest extent possible to minimize the overall surface disturbance resulting from pipeline installation. The maximum width of gathering system pipeline ROW's would be 40 feet, with an average 2,200 feet of buried pipeline required per well in the CRNGDPA. New gas pipelines serving individual wells would be 3-4 inches in diameter and buried to depths of 4-6 feet. Figure 2.6 illustrates typical pipeline construction/installation techniques. Industry standard pipeline equipment, materials, techniques, and procedures in conformance with all applicable regulatory requirements would be employed during construction, testing, operation, and maintenance of gathering system pipelines in order to ensure the safety and efficiency of all pipelines installed in the CRNGDPA.

Depending upon the location of acceptable tie-ins to the existing gathering system, pipeline ROW's would generally be located adjacent to existing roads to the greatest extent possible in order to minimize surface disturbance and maximize construction and gas transport efficiency. Where major excavation is required, sufficient topsoil to facilitate reclamation would be removed from the pipeline ROW's before construction, as determined by the Authorized Officer at the time of pipeline ROW approval. Where ROW's do not require major excavation, vegetation would be removed to ground level by mechanical treatments including either "brush-beating" or scalping, both of which leaves the topsoil intact and minimizes disturbance to plant root systems, thereby facilitating vegetation re-establishment. Brush beating or scalping would typically be limited to an area approximately 15 feet in width along the pipeline ROW. All pipeline ROW reclamation would be initiated as soon as practical following disturbance, but would be completed within a maximum of 1 year following completion of pipeline installation.

All pipelines would be tested with natural gas to ensure the integrity of newly constructed lines. This testing would consist of filling pipeline segments with natural gas and pressurizing the segments to levels exceeding operating pressures (≈ 1,050 psi). If leaks or ruptures occur, they would be repaired and testing would be repeated until successful. Natural gas used for testing would either be returned to the gathering system for sales or would be vented (released) to the surface in accordance with NTL-4A and/or WOGCC Rule 340.

Pipeline construction crews consisting of approximately 6 laborers would install an average of 850 ft of line per day, and a 0.5 mile pipeline segment would require approximately 3 days to complete. A maximum of 4.85 acres of short-term disturbance would be required per mile of pipeline construction/installation. The total estimated surface disturbance required for pipelines in the CRNGDPA is estimated at 147.48 acres.

2.2.9 Ancillary Facilities

Existing compression (486 hp) within the CRU would be augmented on an as-needed basis to provide sufficient additional compression (up to a maximum of 5,000 hp) to move natural gas into the KN Energy, Inc. (KNE) sales pipeline. These additional compressors would be installed at the existing compressor facility (refer to Figures 1.2 and 1.3) and would require an additional 2.0 acres of surface disturbance for installation.

Surface disturbances associated with the initial installation and subsequent enlargement of the compressor facility would require a maximum of 2.0 acres for the LOP. Compressor engines would be fueled by natural gas and would be designed to minimize emissions. A typical stack height for the compressor facility would be 25.25 feet. The facility would not be manned but would be lighted 24 hours per day.

Aggregates to be used for road and well location construction would be acquired from suitable sources (areas) located primarily on federal and state lands in or adjacent to the CRNGDPA. Prior to aggregate extraction, the necessary permits would be obtained from the BLM and/or WDEQ/LQD as appropriate. While no aggregate sources have been identified within or directly adjacent to the CRNGDPA to date, existing sources in the region are believed to have sufficient material to provide the amounts needed for the proposed development.

2.2.10 Hazardous Materials

The Operator has reviewed the EPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the *Superfund Amendments and Reauthorization Act* (SARA) of 1986 (as amended) to identify any hazardous substances proposed for production, use, storage, transport, or disposal by this project, as well as the EPA's List of Extremely Hazardous Substances as defined in 40 CFR 355 (as amended) and determined that numerous materials listed as hazardous and/or extremely hazardous would be used or generated by this project. A summary of this information is available for review at the BLM PRRA in Mills and the Casper District Office. Hazardous materials anticipated to be used or produced during the implementation of the proposed project fall into the following categories:

- drilling materials (sodium hydroxide, fine mineral fibers, heavy metal compounds, etc.);
- casing and cementing materials (fine mineral fibers, polyaromatic hydrocarbons, polycyclic organic matter, aluminum oxide, etc.);
- fracturing materials (fine mineral fibers, etc.);
- production products (natural gas, liquid hydrocarbons, produced water);
- fuels (gasoline, diesel fuel, and natural gas);
- combustion emissions [nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrocarbons, etc.]; and
- miscellaneous materials (methanol, biocides, fertilizers, herbicides, lubricants, etc.).

The Operator, their contractors and subcontractors, would comply with all applicable hazardous material laws and regulations and would locate, handle, and store hazardous substances in an appropriate manner to prevent them from contaminating sensitive resources. Any release of hazardous substances (leaks, spills, etc.) in excess of the reportable quantity as established by 40 CFR 117 would be reported as required by the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) of 1980, as

amended. If the release of a hazardous substance in a reportable quantity does occur, a copy of the report would be furnished to the BLM and all other appropriate federal and state agencies. The Operator would also prepare and implement the following plans and/or policies (as deemed appropriate), copies of which would be available for review (as appropriate) at the BLM Casper District and PRRA Offices:

- Spill Prevention, Control, and Countermeasure (SPCC) Plans for those sites which have storage volumes above threshold levels pursuant to 40 CFR 112;
- Spill Response Plans (oil/condensate);
- an inventory of hazardous chemical categories pursuant to Section 312 of SARA, as amended; and
- Emergency Response Plans.

2.2.11 Abandonment

As producing wells within the gas field become commercially non-productive (estimated 20 to 40 year productive life), the Operator would obtain the necessary authorization(s) from the appropriate regulatory agencies to abandon the depleted well. All above ground facilities would be removed, the well bore would be physically plugged with cement, and both the abandoned road and well location reclaimed according to BLM and/or WOGCC recommendations.

2.2.12 Reclamation

All disturbed surfaces would be reclaimed as soon as possible after the initial disturbance. This reclamation would consist primarily of backfilling the reserve pit, leveling and recontouring of disturbed areas, redistribution of stockpiled topsoil over the disturbed areas, installation of erosion control measures, and reseeding as recommended by the appropriate regulatory agency (BLM or WOGCC).

Reclamation of the reserve pit would be accomplished when the pit is no longer required for completion and/or testing operations. Free standing water in the pit would be allowed to evaporate through natural means to the greatest extent possible prior to the commencement of backfilling; however, in some instances the pit contents may be mixed with suitable solid materials and the pit backfilled, as approved by the BLM or WOGCC. Prior to the mixing of reserve pit contents with approved stabilizing materials, the contents of the reserve pit would be tested for total petroleum hydrocarbons (TPH) and toxicity characteristics leaching procedure (TCLP) constituents, and appropriate closure permits would be obtained from the WOGCC/WDEQ. If necessary, reserve pit contents would be removed and disposed of at an approved disposal facility in a manner commensurate with all relevant county, state, and federal regulations and stipulations.

Reclamation of the well location would be accomplished within a maximum of 2 years following the termination of drilling and completion operations (in the case of productive wells) or well abandonment (in the case of newly drilled dry holes).

2.2.12.1 Producing Well Location

During the initial evaluation phase of operations, the unneeded area(s) of the well pad would be reclaimed as soon as possible after conclusion of drilling, completion and evaluation operations, weather permitting. Reclamation would consist of backfilling the reserve pit, reducing the cut/fill slopes by pushing the fill material back up into the cut, redistributing the stockpiled topsoil over these reclaimed areas, installing erosion control measures, and reseeding as recommended by either the BLM or WOGCC as appropriate. As indicated above, this reclamation would be performed within 2 years of well completion.

2.2.12.2 Access Roads

A minimum of 6 inches of topsoil would be stripped from the access road corridor (new construction portion only) prior to the commencement of construction activities and would be redistributed on the "outslope" areas of the borrow ditch after completion of road construction activities. Erosion control measures would be installed as needed and these borrow ditch areas would be reseeded as soon as practical thereafter. Figure 2.2 shows a typical road cross-section including those "outslope" areas to be reseeded. Likewise, any surface disturbances on/along the "outslope" areas of existing roads within the project area resulting from implementation of the Proposed Action would be reseeded as well.

2.2.12.3 Abandoned Well Location

Upon final abandonment, all existing surface facilities would be removed from the well location as stated in Section 2.2.11. The access road and remaining "work" areas of the well location would be scarified and recontoured, erosion control measures would be installed as necessary, and all recontoured (disturbed) areas would be reseeded as recommended by the BLM or WOGCC.

2.3 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

The following applicant-committed practices, design features, and procedures would be implemented by Intoil in order to minimize impacts to the environment. Each applicant-committed practice is listed only once, under the first resource where it applies; however, many practices apply to several resources and would reduce impacts to each. These practices, design features, and/or procedures may be waived when deemed inappropriate by the BLM if a thorough analysis determines that the resource(s) for which the

measure was developed would not be impacted. Additional site-specific mitigation measures would be identified during the APD and ROW application review processes.

All of the proposed applicant-committed environmental protection measures identified in this section would be implemented on both federal and state lands. Implementation of these measures on private lands would be subject to landowner preferences and agreements with the operator, and where these measures are not implemented additional impacts could occur. Development activities on all lands would be conducted in accordance with all appropriate federal, state, and county laws, rules, and regulations as applicable.

2.3.1 Preconstruction Planning and Design Measures

The Operator and BLM would conduct on-site inspections of each proposed disturbance site (e.g., well sites, roads, pipelines, etc.) to develop site-specific recommendations and mitigation measures.

2. Roads required for the proposed project would be constructed in accordance with BLM Manual 9113 standards (USDI-BLM 1985b, 1991).

3. The Operator would prepare and submit individual drill site design plans to the BLM for approval prior to initiation of construction. These plans would show the layout of the well location over the existing topography, dimensions of the well pad, volumes and cross-sections of proposed cuts and/or fills, location and dimensions of reserve and flare pits, and access road design.

4. Prior to construction, the Operator would submit a Surface Use Plan or a Plan of Development for each well site, pipeline segment, and access road project. These plans would enumerate the measures and techniques to be used for erosion control, revegetation, and restoration, and would provide specific detail on project administration, time frames, responsible parties, objectives, characteristics of site predisturbance conditions, topsoil removal, storage and handling, runoff and erosion control, seed bed preparation, recommended seed mixtures, seed application, fertilization, mulching, site protection, weed and livestock or other herbivore control, and monitoring and maintenance.

5. The Operator would slope-stake construction activities on steep and/or unstable slopes when required by the BLM, and would receive approval by the BLM prior to initiating construction.

6. The Operator would identify aggregate and other road material sources for use in drill site and road construction. The appropriate surface management agency would approve these sources, including timing for extraction, prior to use.

2.3.2 Air Quality

1 The Operator would adhere to all applicable Wyoming Ambient Air Quality Standards (WAAQS) and Regulations including those for fugitive dust suppression presented in Wyoming Air Quality

Regulations on Fugitive Dust Suppression Section 14(F) (WDEQ 1995). If a fugitive dust problem is identified by the BLM as a result of this project, immediate abatement measures (e.g., applications of water or chemical dust suppressants to disturbed surfaces) would be initiated in consultation with the BLM and WDEQ to avoid exceeding ambient air quality standards.

2. The Operator would not allow open burning of garbage or refuse at well locations or other facilities in the CRNGDPA. Any other open burning would be conducted under the permitting provisions of Section 13 of the Wyoming Air Quality Standards and Regulations (WDEQ 1995).

2.3.3 Cultural Resources

1 The Operator would follow the Section 106 compliance process prior to any surface disturbing activity.

2. The Operator would halt construction activities if previously undetected cultural resource materials are discovered during construction. The BLM would be immediately notified, and consultation with the SHPO and Advisory Council would be initiated, as appropriate, to determine proper mitigation measures pursuant to 36 CFR 800.11. Construction would not resume until a Notice to Proceed is issued by the BLM.

2.3.4 Geology and Minerals

1 BLM/WOGCC casing and cementing criteria would be followed to protect all subsurface mineral and water-bearing zones.

2.3.5 Hydrology

1 Construction at drainage crossings would be limited to periods of low-or no-flow.

2. The Operator would follow all practical alternatives and designs to limit disturbance within drainage channels, including ephemeral and intermittent draws.

3. A 100 foot wide buffer area of undisturbed land would be left between construction sites and ephemeral and intermittent channels.

4. Channel crossings by pipelines would be constructed so that the pipe is buried at least 4 feet below the channel bottom.

5. Channel crossings by roads and pipelines would be constructed perpendicular to flow.

6. Disturbed channel beds would be reshaped to their approximate original configuration.

7 All reserve pits would be constructed with a minimum of one-half (1/2) the total depth of the pit below the original ground surface on the lowest point within the pit.

8. All reserve pits would be designed with a minimum of 1 foot of freeboard.

9. The discharge of all water (storm water, produced water, etc.) would be done in conformance with WDEQ/WQD, BLM, and WOGCC rules and regulations (WDEQ 1990; BLM Onshore Oil and Gas Order No. 7).

10. The Operator would prepare SWPPPs for all disturbances greater than 5 acres in size as required by WDEQ NPDES permit requirements. In some instances, SWPPPs for groups of wells would be developed.

11 The Operator would implement SPCC Plans if liquid petroleum products or other hazardous materials are stored on-site in sufficient quantities, in accordance with 40 CFR 112.

2.3.6 Range

1 Removal or disturbance of vegetation would be kept to a minimum through construction site management (e.g., by utilizing previously disturbed areas, using existing ROW's, designating limited equipment/material storage yards and staging areas, scalping, etc.) where and as feasible.

2. The Operator would seed and stabilize disturbed areas in accordance with management direction from the appropriate surface management agency or private surface owner, as appropriate.

3. The Operator would monitor for noxious weeds and apply BLM-approved weed control techniques (e.g., soil sterilants, biological controls), as necessary with the prior approval of the Authorized Officer, BLM.

2.3.7 Soils

1. Prior to commencement of construction activities, all available topsoil (up to a maximum of 12 inches) would be stripped from areas of cut, fill, and subsoil storage, and stockpiled for future reclamation operations.

2. The Operator would keep the area of disturbance to the minimum necessary for drilling and subsequent production activities, while providing for worker safety on site.

3. The Operator would restrict off-road vehicle activity by employees and contract workers.

4. The Operator would restrict project-related travel and reclamation activities during periods when soils are saturated and excessive rutting could occur.

5. Where feasible, the Operator would locate pipelines immediately adjacent to roads or other pipelines to avoid creating separate areas of disturbance.

6. The Operator would minimize construction activities in areas of steep slopes and apply special slope stabilizing structures and techniques (e.g., mulch, matting, etc.) if construction cannot be avoided in these areas.

7. The Operator would not conduct construction and/or reclamation activities using frozen or saturated soils, unless an adequate plan is submitted and approved by the BLM that demonstrates potential impacts would be mitigated.

8. Runoff and erosion control measures such as water bars, berms, and interceptor ditches would be installed as necessary.

9. All drainage crossing structures would be designed to carry at least a 10 year storm event, pursuant to guidelines contained in BLM Manual, Section 9113 (USDI-BLM 1985b, 1991).

10. Upon completion of drilling operations and/or production facility installation, the Operator would restore those areas disturbed in conjunction therewith to the approximate original contours.

11. The Operator would replace topsoil or suitable growth materials over all disturbed surfaces prior to reseeding.

12. The Operator would reseed all disturbed sites as soon as practical following disturbance.

2.3.8 Transportation

1 Existing roads and trails would be utilized to the greatest extent possible and upgraded as necessary to comply with BLM road construction specifications.

2. All roads not required for routine operation and maintenance of producing wells or ancillary facilities would be reclaimed as directed by the BLM, State Land Board, or private landowner. These roads would be permanently blocked, recontoured, reclaimed, and revegetated by the Operator, as would disturbed areas associated with permanently plugged and abandoned wells.

3. The Operator would comply with existing federal, state, and county requirements and restrictions to protect road networks and the traveling public.

4. Special arrangements would be made with the WDOT to transport oversize loads to the CRU. Otherwise, load limits would be observed at all times to prevent damage to existing road surfaces.

5. All development activities along approved ROW's would be restricted to areas authorized in the approved ROW.

6. The Operator would be responsible for maintenance of roads in the project area and for closure of roads following production activities.

7. Where proposed roads would follow existing roads, those portions of existing roads not included in the new ROW would be reclaimed and revegetated by the Operator.

2.3.9 Wildlife

Reserve, workover, and evaporation/production pits potentially hazardous to wildlife would be adequately protected (e.g., fencing, netting) to prohibit wildlife access as directed by the BLM, to ensure protection of migratory birds and other wildlife.

2. USFWS and WGFD consultation and coordination would be conducted for all mitigation activities relating to raptors, and T&E species and their habitats and all permits required for movement, removal, and/or establishment of raptor nests would be obtained.

3 The Operator would implement policies designed to control poaching and littering and would notify all employees (contract and company) that conviction of a major game violation could result in disciplinary action. Contractors would be informed that any intentional poaching or littering within the CRNGDPA could result in dismissal.

4. Firearms and dogs would not be allowed on-site during working hours. The Operator has existing drug, alcohol, and firearms policies that would be internally enforced.

2.4 NO ACTION ALTERNATIVE

The *National Environmental Policy Act* of 1969 (NEPA) requires that the "No Action" alternative be considered in all environmental documents. Under the No Action Alternative, the BLM would deny further natural gas exploration and development on federal lands in the CRNGDPA as currently proposed by the Operator, while allowing other land and resource uses to continue without the impacts which would be associated with the development proposal. Denial of the current development proposal is not, however, a denial of all natural gas development in the area. Under the No Action Alternative, development of lands in the CRU and adjoining areas could occur at levels similar to those which have occurred on the area in the past and could occur as authorized by existing management directives contained in the Platte River RMP, which includes the requirement for a site-specific NEPA analysis.

The decision to select the No Action Alternative for exploration and development in the CRU is available to the BLM through denial of individual APD's; however, the right to drill and develop somewhere within

the leasehold cannot be denied by the Secretary of the Interior. Consequently, the BLM's authority to implement the No Action Alternative is somewhat limited. This limitation is based upon the fact that valid leases have been issued which specifically grant the lessee (or his designated operator) the *"right to drill for, ...extract, remove and dispose of all oil and gas deposits"* in the leased lands subject to the terms and conditions of the respective leases. Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions can be imposed on the lease terms (see *Cooper Valley Machinery Works, Inc. vs. Andrus*, 474 F. Supp. 189, 191; D.D.C. 1973; 653 F. 2nd 595; D.D.C. 1981; *Natural Resources Defense Council vs. Berland*, 458 F. Supp. 925, 937; D.D.C. 1978), but the secretary can not deny development of the lease.

The Tenth Circuit Court of Appeals in *Sierra Club vs. Peterson* (717 F. 2nd 1409, 1983) found that "*on land leased without a No Surface Occupancy stipulation, the Department cannot deny the permit to drill...once the land is leased the Department no longer has the authority to preclude surface disturbing activity even if the environmental impact of such activity is significant. The Department can only impose mitigation measures upon a lessee who pursues surface disturbing exploration and/or drilling activities*". The court goes on to say "*...notwithstanding the assurance that a later site-specific environmental analysis will be made, in issuing these leases the Department has made an irrevocable commitment to allow some surface disturbing activities, including drilling and road building*".

This has been clarified somewhat in Instruction Memorandum 92-67 issued by the Director, Bureau of Land Management on December 3, 1992 which states that *"...Because all oil and gas activities are subject to FLPMA, mitigation required to protect public lands from unnecessary and undue degradation is consistent with the lease rights granted. The caveat, however, is that...unnecessary and undue degradation implies that there is also necessary and due degradation"*. As a matter of policy, any mitigation measures *"...which would render a proposed operation uneconomic or technically unfeasible is not considered to be consistent with a lessee's rights and cannot be required absent a lease stipulation, unless it is determined that such mitigation is required to prevent unnecessary and undue degradation of public lands or resources..."*. To deny all activity would thus constitute a "taking" of the Operators right to conduct exploration activities on the subject federal leases. As the court held in *Union Oil Company of California vs. Morton, "Congress itself can order leases forfeited, subject to payment of compensations. But without Congressional authorization, the Secretary of the executive branch in general has no intrinsic power of condemnation"*.

Based upon the above, selection of the No Action Alternative would deny the proposal as submitted, but would allow BLM to consider additional exploration and development of the federal mineral estate on a case by case basis through individual APD's and site specific environmental analysis. Off-lease access to drill sites and/or the transportation of natural gas products would also be considered on a case by case basis by BLM. Additional oil/gas exploration and development activity could occur on the non-federal mineral estate within the CRNGDPA subject to the approval of the WOGCC and the affected surface owner(s).

Many leases in the CRNGDPA (outside of the CRU) contain various stipulations addressing surface disturbance, steep slopes, wildlife, and other matters of concern. These stipulations would allow the BLM to preclude development in certain areas (e.g., where slopes exceed 25%) or at certain times of the year (e.g., to protect big game crucial winter habitat) if operations cannot be acceptably mitigated. However, there is no stipulation, such as a NSO, that would allow the BLM to preclude drilling operations

everywhere on a lease at all times of the year. If any one of the stipulations cannot be acceptably implemented and impacts mitigated, then an exception would not be granted. A decision, therefore, of no action, as authorized by the leases, would only be considered, given one of the following conditions:

- If there were no acceptable means of mitigating significant adverse impacts to stipulated surface resource values, then this would trigger denial of the APD and require consideration and analysis of another alternative(s). Effectively, exception(s) to one or more of the lease stipulations would not be approved.

- If the USFWS concluded that the Proposed Action and alternatives would likely jeopardize the continued existence of threatened or protected plant and animal species, then the APD and lease development may be denied in whole or in part.

This EA will help to determine whether the proposed project meets any of these conditions.

2.5 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DEPTH

Potential well densities and/or spacing patterns in the CRNGDPA were examined by BLM's Reservoir Management Group (RMG) during initial project design. This examination reviewed geologic data from a variety of sources, both published and unpublished, in order to estimate the level of drilling activity which could be expected in the CRU and adjacent areas. As a result of this examination, the RMG concluded that development within the boundaries of the CRU in addition to those wells which have already been drilled or received approval to drill. In contrast, exploration, and development of those lands outside of the CRU, but within the boundaries of the CRNGDPA, would most likely be on a 160-acre spacing pattern. This would result in the drilling of approximately 26 wells on lands outside of the CRU.

Upon further review, this alternative was rejected because the total extent of exploration and development activity necessary to fully recover natural gas resources in the CRNGDPA is presently unknown. By limiting the overall number of wells in the CRNGDPA, this alternative could inadvertently lead to the by-pass and/or depletion of the federal mineral estate and/or the necessity for future NEPA analyses. Additionally, the BLM has limited authority over the development of private lands and non-federal minerals within the CRU and alternatives guiding development on these lands were therefore considered unreasonable.